Intraoperative Radiation Therapy (IORT) in Breast Cancer: Insights from a Taiwanese Cohort Study and Management of Post-IORT Breast Fibrosis

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Taiwanese Cohort Study Overview

Study Population:

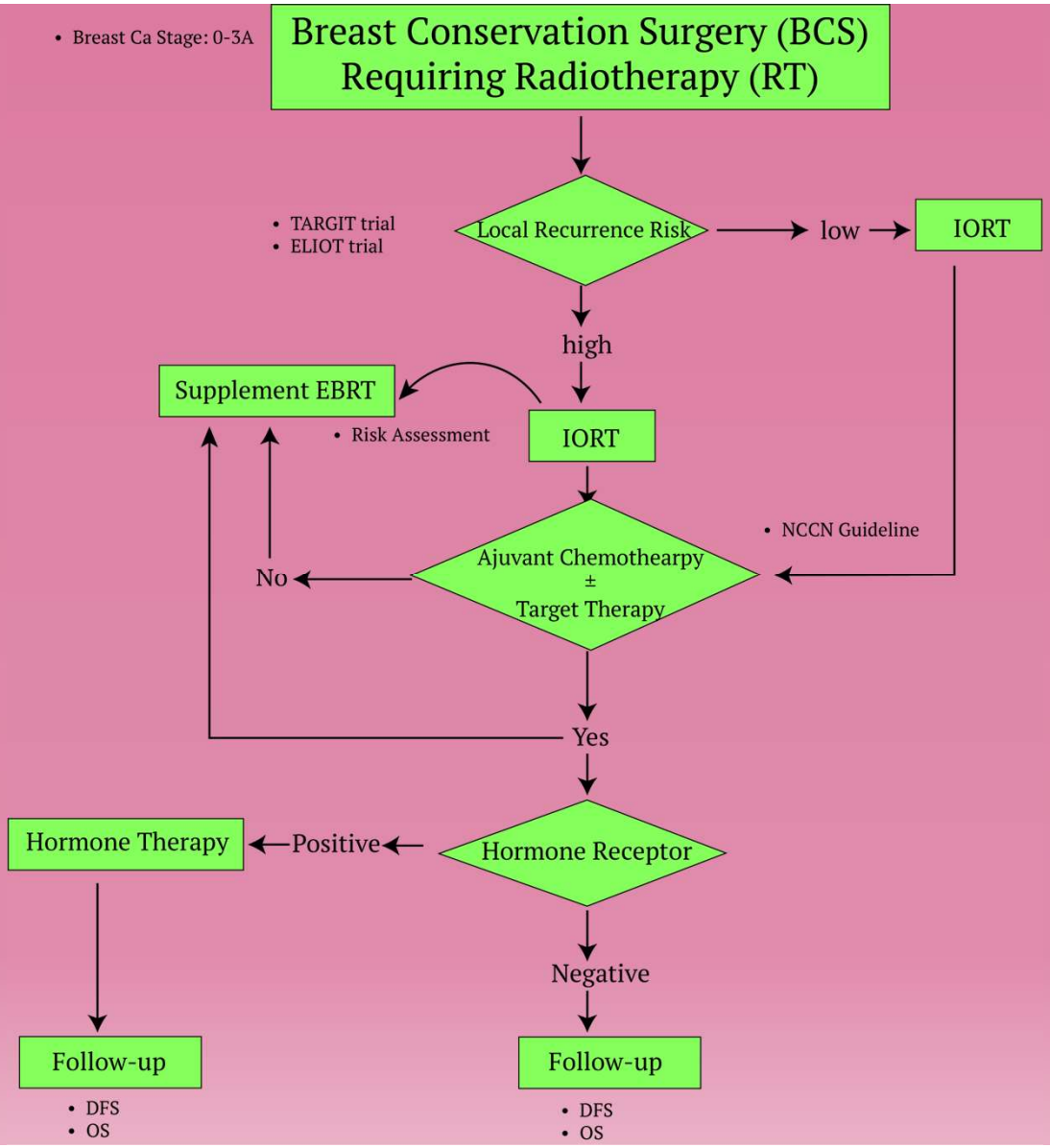
- 1,306 Taiwanese breast cancer patients

Study Period:

- June 2014 – December 2021

Objectives:

- Evaluate local recurrence rates with IORT
- Identify risk factors affecting outcomes
- Assess the impact of supplemental EBRT


• Breast Ca Stage: 0-3A
Breast Conservation Surgery (BCS)
Requiring Radiotherapy (RT)
• TARGIT trial
• ELIOT trial
Local Recurrence Risk
low
IORT
high
Supplement EBRT
• Risk Assessment
IORT
• NCCN Guideline
No
Ajuvant Chemothearpy
±
Target Therapy
Yes
Hormone Therapy
Positive
Hormone Receptor
Negative
Follow-up
• DFS
• OS
Follow-up
• DFS
• OS

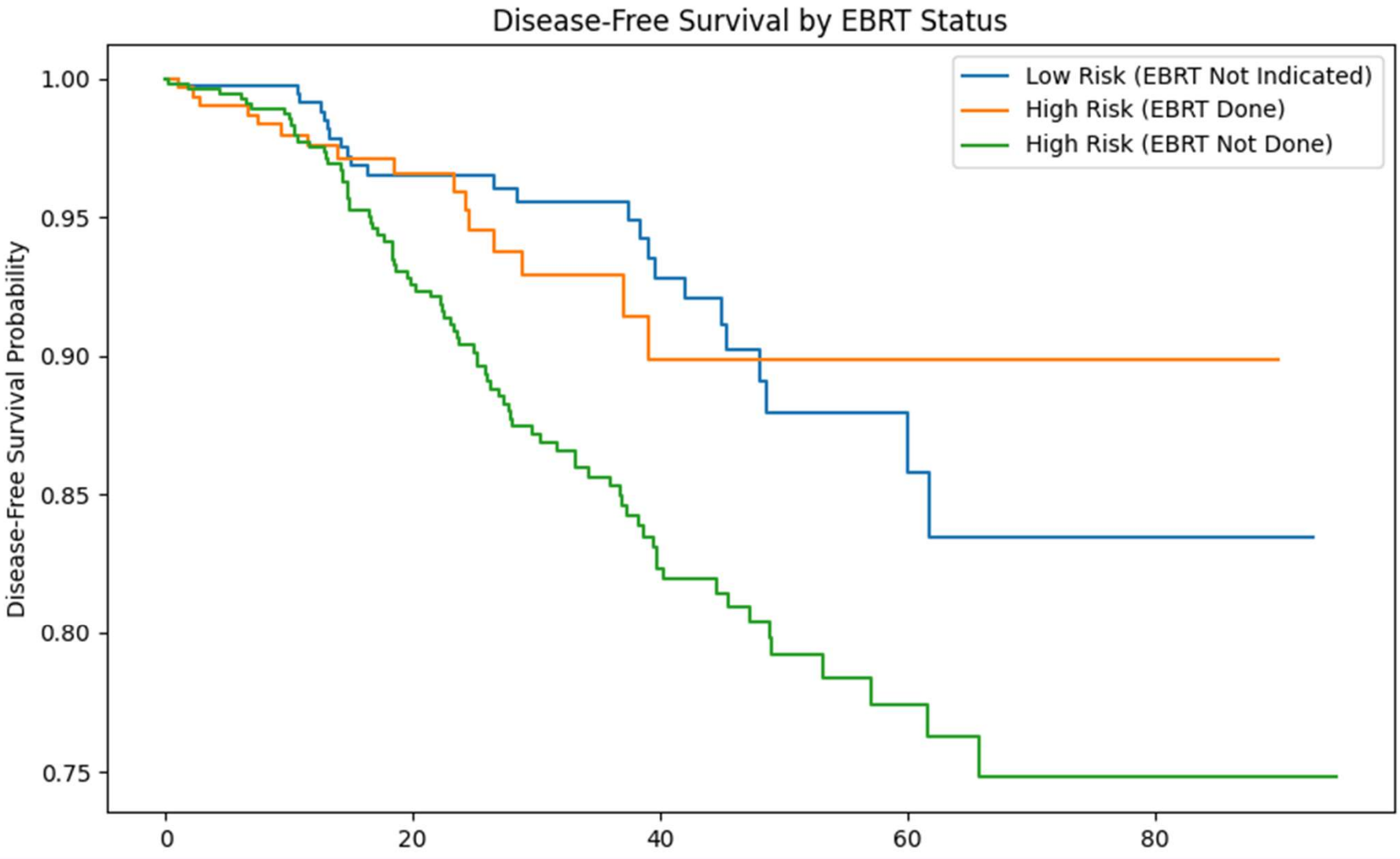
Age (years)	Median 52 (range 24–87); Mean ± SD: 53.0 ± 10.4
Tumor size (cm)	Median 1.5 (range 0.1–3.5)
Histology	IDC 70.6% (n=922), DCIS 19.7% (n=257)
Tumor grade	Grade II 52.5% (n=686), Grade III 30.2% (n=394)
Nodal status	Node-negative 82.3% (n=1,075)
Molecular subtypes	Luminal A 47.2%, Luminal B 33.9%, HER2-enriched 7.4%, TNBC 6.5%
Ki-67 index >30%	39.8% (n=520)

Variable	Hazard Ratio (95% CI)	P-value
Ki-67 >30%	2.29 (1.16–4.55)	0.017
Omission of hormone therapy	2.27 (1.00–5.17)	0.049

Variable	Hazard Ratio (95% CI)	P-value
Omission of supplemental EBRT	2.44 (1.14–5.20)	0.020
High PR status (≥30%)	0.99 (0.98–1.00)	0.006
Age under 45 years	0.93 (0.57–1.53)	0.790

Key Findings

Local Recurrence Rates:	Significant Predictors of Recurrence:	Age Factor:	Impact of Supplemental EBRT:
• Overall: 9.3% • Reduced to 1.78% with guideline adherence	• High Ki-67 index (>30%) • Omission of hormone therapy • Omission of supplemental EBRT	• Age <45 not a significant predictor	• Reduced recurrence risk by 48.8% in high-risk patients


Disease-Free Survival by EBRT Status
Low Risk (EBRT Not Indicated)
High Risk (EBRT Done)
High Risk (EBRT Not Done)
Disease-Free Survival Probability
1.00
0.95
0.90
0.85
0.80
0.75
0
20
40
60
80

Implications for Radiation Oncology

Patient Selection:

- Age should not be the sole criterion for IORT eligibility
- Importance of tumor biology (e.g., Ki-67 index)

→

Supplemental EBRT:

- Essential for high-risk patients
- Aligns recurrence risk with low-risk patients

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Guideline Adaptation:

- Need for tailored guidelines for Asian populations

Post-IORT Breast Fibrosis

Definition:	• Fibrosis: Thickening and scarring of breast tissue post-radiation
Clinical Significance:	• Can affect cosmetic outcomes • May cause discomfort or pain
Incidence:	• Variable rates reported • Requires attention in patient follow-up

Potential Link with Oncoplastic Surgery

Oncoplastic Surgery:

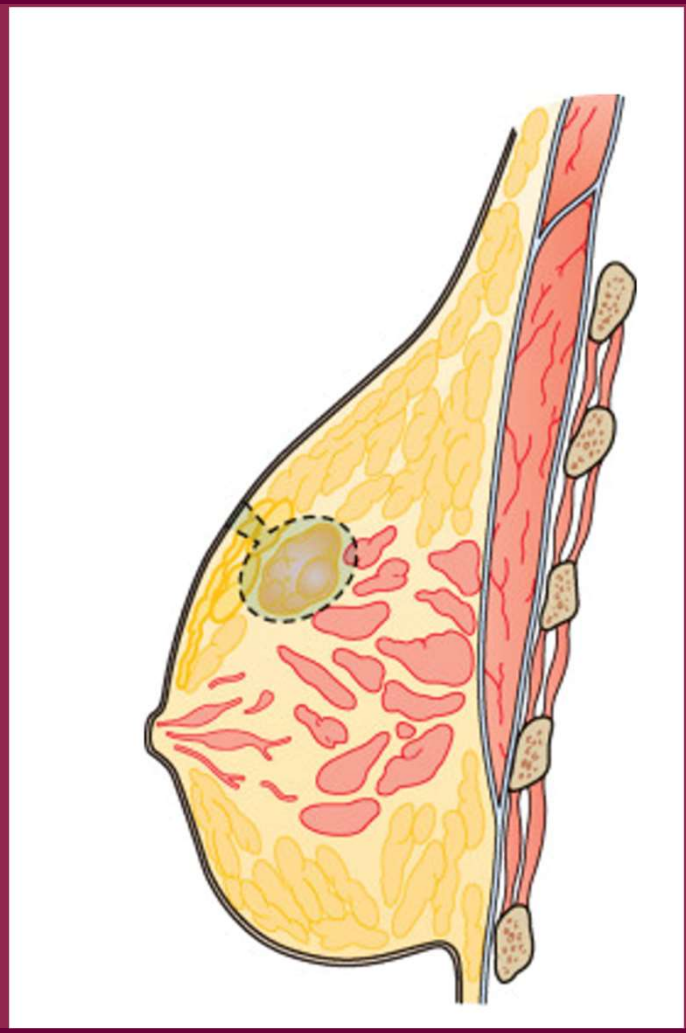
- Combines oncologic and plastic surgery techniques
- Aims to improve cosmetic outcomes

Hypothesis:

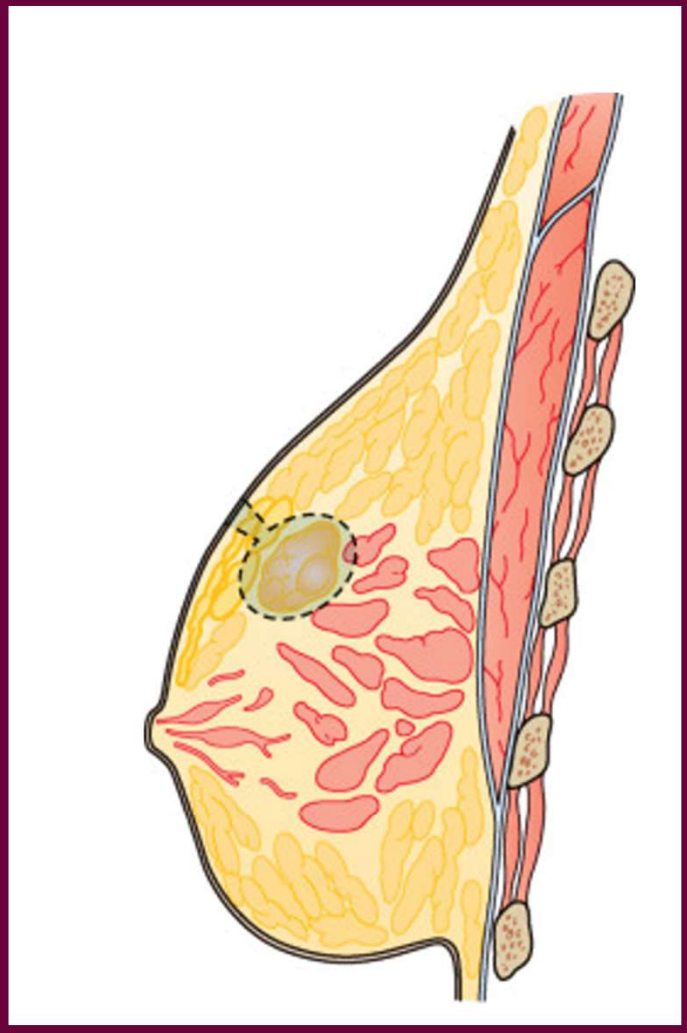
- Oncoplastic procedures may increase fibrosis risk due to:
  - Increased tissue manipulation
  - Altered blood supply
  - Changes in radiation dose distribution

Current Evidence:

- Limited studies available
- Observations suggest a possible association



A comparison illustration showing a tumour within a breast of half the size, comparing Western and Eastern women with breast cancer. Emphasise the size of the tumour relative to the smaller breast, highlighting the differences in anatomy and the surgical considerations between the two cases.



Management Strategies for Fibrosis

Early Detection:

- Regular clinical examinations
- Patient self-monitoring

Non-Surgical Interventions:

- Physical therapy: Refer patients to physiotherapsts or massage therapists
- Medications
- **Timing:**
  - Begin massage after adequate healing from surgery and radiation, typically several weeks post-treatment

Surgical Options:

- Reserved for severe cases
- Aimed at relieving symptoms

Preventive Measures:

- Optimize radiation planning
- Minimize unnecessary tissue trauma during surgery

Conclusions

Key Messages:

- IORT is effective when guidelines are followed
- Age should not exclude patients from IORT
- Supplemental EBRT is crucial for high-risk patients
- Awareness of fibrosis risk is important, especially with oncoplastic surgery

Future Directions:

- Further research on fibrosis incidence and management
- Refinement of treatment guidelines

Given these findings, are our current guidelines truly addressing the needs of Asian patients undergoing IORT?

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- **Contact Information:**
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- Open for questions and discussion